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EXAMINER

SCULLY, STEVEN M

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Art Unit: 1795

**THIN-FILM CATHODE FOR 3-DIMENSIONAL MICROBATTERY AND METHOD FOR
PREPARING SUCH CATHODE**

Examiner: Scully S.N.: 10/531,529 Art Unit: 1795

January 5, 2010

DETAILED ACTION

1. The Amendment filed November 3, 2009 has been entered. Claims 3, 15, 28 and 40 are canceled. Pending claims 26, 32-33 and 38 and withdrawn claims 1, 7-8, 13-14, 19-20, 25, 39, 44-45 and 50 are amended. Pending claims 29-31 and 34-37 and withdrawn claims 4-6, 9-12, 16-18, 21-24, 41-43 and 46-49 are unchanged. Accordingly, claims 26 and 29-38 are pending examination in the application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

3. Claim rejections of claims 26, 29, 30 and 32-37 under 35 U.S.C. 102(b) as being anticipated by Nathan et al. (US6,197,450) are withdrawn in light of the Amendment.

Claim Rejections - 35 USC § 103

4. Claim rejection of claim 31 under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Rigal et al. (US4,346,153) is withdrawn in light of the Amendment.

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5. Claim rejection of claim 38 under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Ohsawa et al. (US6,197,450) is withdrawn in light of the Amendment.

6. Claims 26, 29, 30 and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Noda et al. (US5,268,243).

With respect to claim 26, Nathan et al. disclose a microbattery, consisting of an anode, an electrolyte and a cathode on a perforated silicon wafer. The perforated conductive substrate includes a plurality of cavities formed therein, wherein the cathodic layer, electrolyte layer and anodic layer are deposited therein. See column 4, line 64-column 5, line 4; Figure 1A.

With respect to the cathodic material, Nathan et al. disclose a cathode material of LiCoO_2 , LiNiO_2 , LiMn_2O_4 , TiS_2 , V_2O_5 , V_3O_8 or lithiated forms of the vanadium oxides. Nathan et al. do not disclose the claimed cathodic active material. Noda et al. disclose a battery comprising a negative electrode and a positive electrode with a separator therebetween. The positive electrode active materials include, for example, CuO , Cu_2O , CuS , CuSO_4 , TiS_2 , V_2O_5 , V_6O_{13} , CoO_3 , CoO and metal compounds of the general formula Li_xMY_y and $\text{LiM}_y\text{N}_x\text{X}_2$ (where M and N are respectively metals of groups I and VII, X is a chalcogen compound such as oxygen and sulfur). See column 5, lines 15-31. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute one known element for another to obtain predictable results because Nathan et al. and Noda et al. disclose overlapping examples of the positive electrode

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active material and one of ordinary skill in the art at the time of the invention would have thus expected the results of the substitution to have been predictable. *KSR*

International Co. v. Teleflex Inc., 550 U.S. ___, ___, 82 USPQ2d 1385, 1397 (2007).

With respect to claim 29, Nathan et al. disclose the substrate can be glass.

Further, the substrate can optionally have a current collector. See column 2, lines 26-38.

With respect to claim 30, the claim limitations of claim 30 do not further limit the product of claim 29 because they are product-by-process limitations. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

With respect to claims 32 and 34, Nathan et al. disclose the substrate is provided with a plurality of cavities with high aspect ratio, between about 2 to about 50, and with the anode, cathode, solid electrolyte layers and optional current collector layer being also deposited throughout the inner surface of the cavities. See claims 1 and 8.

With respect to claim 33, Nathan et al. disclose the cathodic layer, electrolyte layer and anodic layer are continuous. See Figure 1A.

With respect to claim 35, Nathan et al. disclose the cavities have a cylindrical geometry. See claim 9.

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With respect to claims 36-37, Nathan et al. disclose the substrate material is made of a single crystal or amorphous material and is selected from glass, alumina, semiconductor materials for use in microelectronics, or ceramic materials, and the substrate material is preferably silicon. See column 3, lines 25-34.

With respect to claim 38, Nathan et al. in view of Noda et al. disclose positive active materials such as CoO and CoO₃. See column 5, lines 15-31.

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Noda et al. (US5,268,243) as applied to claims 26, 29, 30 and 32-38 above, and further in view of Rigal et al. (US4,346,153).

With respect to claim 31, Nathan et al. disclose a carbon current collector. See column 6, lines 10-14. Nathan et al. do not disclose a conductive layer formed of at least one material selected from the group of claim 31. Rigal et al. disclose an electrode for a lead-acid storage cell. Rigal et al. disclose that current collectors have been used which are made of a material whose electric conductivity is higher than that of lead, such as copper. See column 1, lines 26-30. Further, copper is a well known metal for use as a current collector due to its good electrical conductivity and low electrical resistance. It would have been obvious to one of ordinary skill in the art at the time of the invention to use copper as the current collector of Nathan et al. because Rigal et al. teach that it has good electric conductivity.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 26 and 29-38 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of copending Application No. 11/374,469. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1, 3-5 and 10 disclose a perforated conductive substrate having a cathodic layer, an electrolyte layer and an anodic layer formed thereon. The substrate comprises a plurality of cavities which comprise through cavities communicating with the two outer surfaces, wherein the electrolyte separator layer extends over the two outer surface and the second electrode layer is formed over the electrolyte separator layer and the first electrolyte layer is deposited at least over the interior cavity surfaces. The cathode comprises, for

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example, WS_2 , CuS, CuS_2 , CoO. While '469 does not disclose thin films, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the battery of '469 using thin film electrodes and electrolyte to reduce the volume of the battery.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

10. Applicant's arguments with respect to claims 26 and 29-38 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Scully whose telephone number is (571)270-5267. The examiner can normally be reached on Monday to Friday 7:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571)272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. S./

Examiner, Art Unit 1795

/Dah-Wei D. Yuan/

Supervisory Patent Examiner, Art Unit 1795